G R. S. 59]

GENERAL AND REVENUE SECRETARIAT. P-43

1913
Genl. Misc

File No. 134-1a

Serial Nos. 1-3

Papers Filed:

Month June 1913

SUBJECT.

Note by Mr. M. Visvesvaraya, C.I.E. on certain Irrigation Projects in Baroda reserve for his opinion.

PREVIOUS REFERENCES.	LATER REFERENCES.

12/7/13
23-7-13

K. N. Krishnaswamy 25-6-13

G.R.S. 11] 1912-13

GENERAL AND REVENUE SECRETARIAT

(Gen-Misc.)

NOTES.

File No. 134-12

FILE HEADING.

Application of the Baroda Durbar for a loan of the services of Dr. M. Visveswaraya, Chief Engr. of Mysore, in connection with certain irrigation & Waterworks projects in the Baroda State.

From

The First Assistant Resident.

No. 4984 Dated 29-8-12 Received 30-8-12

Diary No. 1173	Enclos. 5 Spare Copies.	Serial No. 1

BRIEF ABSTRACT OF LETTER.

Forwards a copy of letter No. 9449 d. 20th idem from the Resident at Baroda applying for a loan of the services of Mr. M. Visveswaraya in connection with certain irrigation & water works projects in that State & requests to be informed whether the Durbar would spare Mr. Visveswaraya's services & if so, what remuneration including T.A. &c. should be paid to him by the Baroda Durbar.

NOTES AND ORDERS.

Submd.
4.114 VS.41
30-8-12
Fees)

30-8-12

Dewan

30/8

30/8

1173
31/64
30-8-12

NOTES—First Sheet.

GPB—30,000—12-8-11

134-12

Submitted to His Highness.

I submit for information, copy of Residency letter dated 29th August forwarding copy of a letter from the Resident at Baroda, applying for the loan of the services of Mr. M. Visvesvaraya, Chief Engineer, for consultation in regard to some irrigation and water work projects under consideration there.

2. The original will be submitted for His Highness' orders in due course.

BR2

P. Ramanathan
Dewan

Fin 184 - 12

Record of Cases submitted for the Orders of His Highness the Maharaja

Subject.

Copy of Residency letter of 29th August 1912, enquiring whether Mr. Visvesvaraya's services could be lent to the Baroda Durbar for consultation in connection with certain Irrigation and Water-works Projects under contemplation.

* 226
Rel'd with Do. no. 109 A 7-9-12

Order.

Pm 134-12

Submitted to His Highness.

"Paper under disposal"

I submit for the orders of His Highness letter No.4984 dated 29th August 1912 from the First Assistant to the Resident in Mysore requesting at the instance of the British Resident at Baroda, to be favoured with the views of the Mysore Durbar as to whether they would spare the services of Mr.Visvesvaraya to study, if need be, on the spot certain irrigation and water works Projects of the Baroda State and if so, what remuneration including travelling allowances &c., should be paid to him by the Baroda Durbar.

2. In view of the important public works that are now on hand in Mysore, I would venture to suggest that a reply may be sent to the effect that the Mysore Durbar regret their inability to spare the services of Mr. Visvesvaraya in the near future.

T. Ananda Rao

31/Aug/12

Sm/136/12

Record of Cases submitted for the Orders of His Highness the Maharaja

Subject.

Residency letter enquiring if the Mysore Durbar would spare the services of Mr. Visvesvaraya for consultation in connection with certain Irrigation and Water works projects under contemplation in Baroda.

31.8.12
565

Returned with D.O. No. 109 S/12

D.O. No. 109
Five 2 files

PRIVATE SECRETARY MYSORE

The Palace,

Mysore, 7-9-12.

My dear Sir,

I am directed to return two accompanying files and to ask that the papers may be shown to Mr. Visvesvaraya with a view to ascertaining whether he is likely to be able to spare time for being deputed to Baroda.

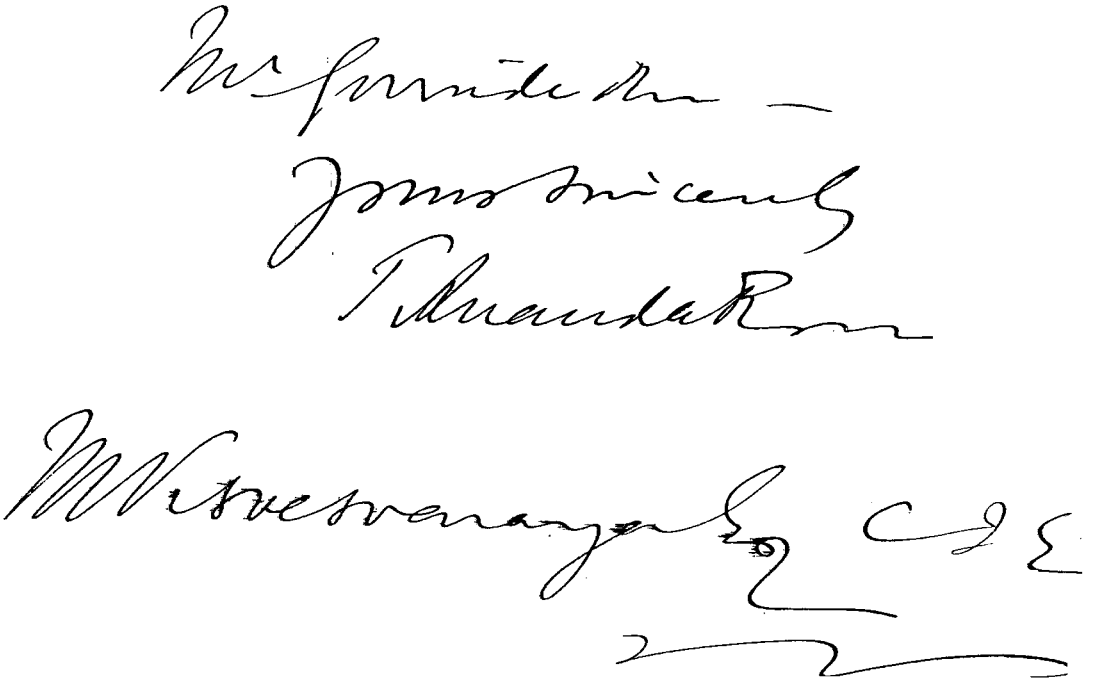
Yours sincerely,

T. Ananda Row Esq., C.I.E.,
Dewan of Mysore, Bangalore.

GOVERNMENT OF MYSORE

My dear Sir

Please see here below the Residency letter inquiring if the Municipal Engineer could render services for consultation in connection with certain drainage & Water works projects under contemplation in Bangalore. I have written to Mr Bell to let you see the papers with a view to ascertaining whether you are likely to be able to spare time for being deputed to Bangalore. I am sending the papers with



ad interim
appt as Dr / Rs

D. O. No. 2193

THE MYSORE RESIDENCY,

D. O. No. 388. 6.2.13

Bangalore, 18th January 1913.

My dear Dewan Sahib

Will you kindly refer to my letter No. 4984, dated the 29th August 1912, regarding certain -- Irrigation and Water Works Projects of the Baroda State.

2. At the instance of the Baroda Durbar, the -- Resident at Baroda has written to enquire whether you have had time to examine the projects in -- question. Now that you have been appointed Dewan of Mysore, the Baroda Darbar apprehend that you will hardly find time to devote attention to the projects if you have not already done so, and -- suggest that, in that case the papers and plans should be returned to them so that other arrangements may be made for their examination.

Yours Sincerely

M. Visvesvaraya Esq., C.I.E.,

Dewan of Mysore.

408

Bangalore,

10th February 1913.

My dear Mr. Warburton,

I am in receipt of your D.O. letter No.388 dated the 18th January 1913 regarding certain irrigation and water supply proposals in the Baroda State on which my opinion was wanted.

The Baroda Durbar desired that I should visit the - - works before giving an opinion and they now recognise that it will not be possible for me to ~~comply with their request~~. ~~I~~ ~~want, if possible~~, to send them some notes based on the information contained in the papers. I am studying the papers and - - hope to be able to return them, with my notes, very shortly.

Yours sincerely,

RG

10.2.13

P.B. Warburton, Esq., I.C.S.,
First Assistant to the
Hon'ble the Resident in Mysore,
Bangalore.

G. R. S. 12]

10

General and Revenue Secretariat.

G. M. File No. 134 of 1912-13

Serial No.	
2	To the J.A. Resident. Nos. Pol. 816 d. 24/25. 3. 1913. Forwards the notes prepared by Mr. M. Visvesvaraya on the points on which his opinion was required and states that he much regrets that his recommendations cannot be more precise on account of his inability to visit the site of the proposed works.

P. T. O.

NOTE—Contn. sheet.

GIP—65,000—17-6-12.

Jan 134 -i-

Submitted to His Highness.

I resubmit herewith the file returned wit

Mr. Campbell's D.O. No.109 dated 7th September last in reference to Residency letter No.4984 dated the 29th August 1912 asking for the loan of my services in connection with certain Irrigation and Water - - Supply Projects in the Baroda State. As I could not visit Baroda, I have contented myself by giving my recommendations as far as it was possible to do so on the information available in the papers received.

Lent file".

I enclose a copy of the Notes furnished -- by me.

M. Visvesvaraya

...e March 1913.

Record of Cases submitted for the Orders of His Highness the Maharaja

Subject.

Notes by Mr. M. Visvesvaraya on certain Irrigation and Water Supply Projects in the Baroda State.

781

Order.

~~KRW~~

1/4/13

Secretary's file

3-4-13 RO

B ii

WS 4/4

WS 5/4

R. S. 12]

General and Revenue Secretariat.

G. M- File No. 174 of 1912-13

6664

Serial No.	
3	From the J.A. Resident— No. 3172 dt. 26-5-1913. Conveys the thanks of the Baroda Durbar to Mr. Visvesvaraya for his very useful notes on the projects referred for his opinion and States that H.H. the Maharaja Gaekwar much appreciates them. Forwd. 2/6/1913. (See 7) SOM 4/6
	Dewan 28 4/6/13

3353/5.6.13

NOTE—Contn. sheet.

GPB—65,000—17-6-12.

Para 134 (2)

14

Submitted to His Highness.

In continuation of my note No. 1117 dated 25th March 1913 submitting a copy of my notes on certain irrigation and water supply projects in the Baroda State I submit for information Residency letter No. 3172 dated 26th May 1913, conveying the acknowledgments of the - Baroda Durbar.

M. Visvesvaraya

"Paper under disposal"

BR

fm 13472

Record of Cases submitted for the Orders of His Highness the Maharaja

Subject.

Residency letter of 25th March 1913 communicating the thanks of the Baroda Durbar to Mr. Visvesvaraya for his very useful notes on certain irrigation projects in Baroda.

No. 1036

Order.

~~KRM~~

11/6/13

By

Secretary

11.6.13

By

14/6

17/6

Ws

Lab Dis 317 & 29.8.12

V Copy to Dewan 29/8 Rm Copy sent to Lab 29/8

No. 4984
2 — 1 with 4 enclosures

From

P. B. WARBURTON, Esq., I. C. S.,
FIRST ASSISTANT TO THE RESIDENT IN MYSORE.

Secy) Immediate 29/8

DIARY No. 1173

18:313
Gen Misc
134-12

To

The Dewan of Mysore.

Dated Bangalore, 26th August 1912.

Sir,

I am directed to forward herewith a copy of a letter No. 9449, dated the 20th August 1912, (with enclosures), from the Resident at Baroda, applying for the loan of the services of Mr. M. Visvesvaraya, Chief Engineer of the Government of His Highness the Maharaja, and to request that the Resident may be favoured with the views of the Durbar as to whether they would spare Mr. Visvesvaraya's services, and if so, what remuneration including travelling allowance &c should be paid to him by the Baroda Durbar.

(1) Report on Irrigation works by R.B.Patel M.R.A.C
(2) Harij reclamation bund
(3) Pratapora Tank Tipan
(4) Filteration of water at Nimita Taluq.

I have the honour to be,

Sir,

Your most obedient servant,

P B Warburton

First Assistant Resident.

B.7

R. O. 2.—R. P. B.—8-1912.—500.

Enclosure to sl-(1) (2)

Letter No. 9449 dated the 20th August 1912 from the -- Offg. Resident at Baroda to the Hon'ble the Resident in Mysore

The Baroda Durbar wish to consult Mr. Visveshwariya, the Chief Engineer of the Mysore State, regarding some Irrigation and Water Works Projects that are under consideration. It will probably be necessary for him to visit the actual sites of the proposed works on the commencement of the cold weather and study details on the spot

2. I have the honour therefore to enquire whether the -- Mysore Durbar would be able to lend Mr. Vishveshwariya's services for the proposed work, and if so, what remuneration -- should be paid to him by the Baroda Durbar including travelling charges etc.

3. I send herewith the projects to enable Mr. Vishveshwariya to form an idea as to the nature of the work and the probable time it would take.

C O P Y.

Registrar,

Mysore Resident's Office.

P&C No. 816/encls five. Bangalore,

24th March 1913.

25-

Sig recd by Sir K.R Srinivasaiyangar

From

The Secretary to Government
of H.H. the Maharaja of
Mysore, Genl. & Rev.
Departments.

G.M-134-12
Sl-2.

To

The First Assistant to the
Hon'ble the Resident in
Mysore.

Sir,

I am directed to return the reports and papers, relative to certain Irrigation and Water Supply Projects in the Baroda State, received with Residency letter No.4984 dated the 29th August 1912, and to forward herewith Notes in 4 sections prepared by Mr. M. Visvesvaraya on the points on which his opinion was required. He much regrets that, ~~his recommendations are not more decisive~~ he was not able to make precise, on account of his inability to visit the site of the works, it was not possible to make his recommendations more precise.

I have &c.,

RB 24.3.13

25/3/13
Secretary to Government,
Genl. & Rev. Departments.

Documents accompanying -

(1) Original papers relating to the four schemes received from the Baroda Durbar.

(2) Notes on schemes or proposals in four sections.

(1) Report on Irrigation Works by R.B. Patel, M.R.A.C.
(2) Hariy reclamation bund
(3) Pralappura Tank
(4) Filtration of water at

(4)

Notes by Mr. M. Visvesvaraya on certain Irrigation and Water Supply Projects in the Baroda State, received with ~~D.O~~ letter No.4984 dated the 29th August 1912 from the First Assistant to the Hon'ble the Resident in Mysore.

In the papers received from the Baroda State, four schemes or subjects, as under, have been referred to me for opinion:-

I. Questions connected with certain irrigation works recently undertaken in the State.

II. Harij Reclamation Scheme for reclaiming lands damaged by salt efflorescence.

III. Pratappura Tank Scheme for providing additional storage for the water supply of Baroda and for irrigation.

IV. Certain proposals for improving the settling tanks and filter beds of the Baroda water supply.

I attach brief notes on each in four corresponding sections.

I was expected to furnish my opinion and recommendations after a personal inspection of the works, or sites of works proposed, and after making local enquiries and collecting further data. A personal inspection, I regret to say, is not now possible. The maps and engineering details sent to me are not sufficiently complete to enable me to form a clear idea of the present state of the works. I have therefore had to form my opinions on insufficient data and my recommendations will therefore need further investigations before they can be deemed fit for practical action.

Section I.

Irrigation works recently undertaken in Baroda.

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1. Preliminary.- The report - forwarded for opinion is the result of an investigation ordered by His Highness the Maharaja Gaikwar's Government in - - order to ascertain why certain irrigation works recently started in the Stat have proved so extremely disappointing financially. The works investigated - comprise the Orsang - Wadhwana Scheme - in progress and several typical tanks - constructed as famine relief works.

A perusal of the reports - - shows that sufficient data based on - - local experience were not available for the design and construction of small - tanks. The works were started for - - famine relief in a hurry and very few - of them have proved remunerative. As a matter of fact, similar undertakings - started under like circumstances in - - British India in the neighbourhood - - have also proved disappointing.

In raising the spring water - level, in supplying water for cattle - and in other ways, the tanks have an - indirect value which cannot be despised. A determined effort should be made to improve the works already - - built. The financial results, so far,

have

have been unsatisfactory but this is a very common experience at commencement. It should be sufficient if, in constructing new works in future or in completing those already started, the preliminary investigation is more thorough and the lessons taught by the mistakes already made are not lost sight of.

2. Orsang - Wadhwana Scheme.-

The Wadhwana Tank has been constructed to store 150 million cubic feet and estimates have been sanctioned to enlarge its capacity to 500 million cubic feet. The tank is fed by the Jojwa Canal from the Orsang River and the supply of water from the latter and the natural features of the country seem favourable for a large storage. In a year of average rainfall, water is available in the river for filling the tank, only for about 2½ to 3 months during the monsoon. The existing Jojwa Canal and its headworks seem capable of passing only about 350 million cubic feet into the tank during this period, and in order to increase the storage, the canal should undergo material alteration and improvement.- For this reason, Mr. Raojibhai Patel recommends that, including the storage from its own catchment, the capacity of the tank should be limited to 400 - - -

million

million cubic feet for the present till demand arises for more water. Rough figures are given to show that about - - Rs.1 lakh can be saved on the tank - - scheme and Rs. 2 lakhs on other works - by the adoption of his proposal.

As, however, some expenditure seems to have been incurred already on enlarging the capacity of the tank to - 500 million cubic feet and the savings anticipated by restricting the capacity to 400 million cubic feet will only - - amount to about Rs.95,000, I would recommend the construction of a tank to - store 500 million cubic feet leaving - - the enlargement of canal and other - - works for future completion. This - - course, if adopted, will result in a - - saving of about Rs. 2 lakhs and secure an additional storage of 100 million - - cubic feet which will be available in all good years and which will be useful if carried forward for use in a bad - - year, in increasing the protective - - value of the work.

The measures proposed for - - utilising the water seem to be sound - - and may be adopted. But irrigation - - intended merely for insuring the crops is not likely to pay. If the crops are able to dispense with protection for a series of years by reason of favourable rainfall, the cultivators will be - -

tempted to forget that there is any - - advantage in insurance at all.

If a permanent demand can be created for garden or other perennial - or commercial crops, the advantages of irrigation will be very much better - - appreciated and people will be able to pay higher rates. Wherever water is - available, it should be utilised to - - irrigate as large an area of perennial crops as possible. This seems to be - the proper policy to pursue in devising measures for utilising the water of the Wadhwana Tank. If water is reserved - merely for protecting dry crops in - - order to prevent fluctuations in the - yield of the crops, a part of the - - working expenses should come out of - - land revenue.

3. Karachia Tank (Saoli Talu

I am not surprised that the tank in - - its present state has not answered expectations. It seems to have been constructed as a relief work. The earth used in construction was bad and for - want of water it was not properly consolidated.

The embankment should be - - raised to the full height and brick - - pitching provided in the front slopes where necessary.

The

The length of the weir should be increased so as to give a run-off of 1 inch with a flood depth of 2 feet.

The weir level may be kept - - one or two feet lower than is necessary in the final stage and raised gradually after the dam is tested.

The proposals for distribution of water in blocks assisted by a - punch seem very sound and deserve a - - full trial.

The tank and subsidiary works may be completed as recommended. If - - the working is carefully supervised, - - after six or seven years, the most - - advantageous way of using the water - - will become apparent and the tank may - begin to prove remunerative. In the - case of these small tanks, Government - should not be too anxious to get an - - immediate return.

4. The Manorpura Tank.- The - run-off assumed for the weir should be increased to one inch and the depth of spillage reduced, if possible, from 3 feet to 2½ feet. The weir crest may be lowered by 2 feet as proposed. The - - angular bend should be strengthened by a revetment in front and by efficient - drainage at the rear toe.

5. Mota Ankadia Tank.- This tank seems to be situated in a region of scanty rainfall.

The tank dam seems to be well built but the bed is made of khara soil and leaky. The site does not appear to have been properly examined before building the dam. The excessive leakage noticed is doubtless due to the puddle wall not having been carried down to rock or other impervious material.

It is not desirable to proceed with a costly toe wall of cement concrete until experience shows that the tank bed cannot be rendered water-tight by the deposit of silt. A toe wall may not be sufficient to effectively stop leakage.

The correct catchment area should be ascertained and endeavours made to increase the supply into the tank.

6. Mota Bhandaria Tank.- The bed of this tank is also of khara soil. The dam is badly made being constructed in a hurry as a relief work, and the materials used in its construction seem porous. The top of the bund is not raised sufficiently high for safety above the maximum water level, and there is a bad bend in the embankment.

I think the waste weir should be lowered and the level of water kept well within the limit at which leakage would be dangerous to the stability of the dam. The inner slope may be - - - pitched with stone as recommended.

The supply seems to be abundant but the construction of a concrete wall is not recommended till more experience is gained of the working of - - these tanks. There appears to be no - - justification for breaching the tank, - but measures necessary to lower the - - full supply level may be adopted instead.

7. Shri Chimnabhai Sarowar at Kadripur. This is a fine work, but its - main defect is its insufficient supply. In the absence of complete data, no - - suggestion can be made for improving - · the storage. The catchment area has - · yet to be correctly ascertained. No - · further expenditure should be incurred · on this work without first devising - - means of increasing the storage.

8. The Sabarmati Scheme.- A - prolonged investigation by an expert is necessary in order to handle a scheme of this magnitude. Investigations may be undertaken if the services of an experienced officer ~~is~~ are available.

Section II.

Harij Reclamation Bund.

Reclamation of Usar Lands.

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9. Theoretically considered, the measures enunciated are satisfactory. - They have been tried in the United - - Provinces of Agra and Oudh and in the - Western States of America and other - - places. But difficulties and disappointments are experienced in actual practice. It is easier to prevent - - deterioration of the soil than to reclaim lands already impregnated with - salts.

10. Where a soil shows a tendency towards efflorescence, the inference is that, in that particular area, the subsoil water is flowing up to the surface charged with salts and that, when the water evaporates from the surface, the salts are left behind or deposited in the form of a crust over the land. If drainage measures are adopted in - good time, the rise of subsoil water - will be prevented and the progress of further salt deposits checked.

11. The method recommended of - storing water in tanks and washing the surface may be tried to a small extent but not on the extensive scale proposed. The composition and - - - -

characteristics

characteristics of the plot of land - - marked out for experiment should be - - scientifically investigated and the results recorded before the experiment is begun. After each year's washing, the process must be repeated and the results watched. But before washing is commenced, the area should be invariably - drained. I have no faith in any other method of reclamation.

12. The real difficulty in judging of the success of a ny remedial measure is that the experiment and observations take a long time to complete. Unfortunately private cultivators are unable to practise scientific methods; and it is - difficult to secure continuity of policy or operations when the work is supervised by Government Irrigation Officers who are liable to be transferred to - - other districts or duties.

Reclamation is a slow process and, unless very closely supervised by persons interested in the work, the - - results will usually be found to be not commensurate with the outlay.

13. About the year 1902, a Committee of three officers of whom I was one, submitted certain recommendations for preventing salt efflorescence in certain lands under the Nira Canal in the Poona District. The results of the methods then adopted might probably be

of

of some value. I would suggest that an officer be deputed for a few days to - study what has been done. I believe - larger measures on the lines recommende by the Committee are in contemplation. If required, I shall be glad to supply a copy of the report originally submitted by the Committee.

Section III.

Pratappura Tank.

-

14. The supply in the Sayaji - - Sarowar, the source of water supply - - to the city of Baroda (with a catchment of 48 square miles and an annual yield of 400 to 700 million cubic feet() is - said to be insufficient for the requirements of the city in years of defective rainfall. It is therefore proposed to construct a tank at Asoj known as the Pratappura Tank across a portion of the valley of the Viswamitri River to supplement the storage in the Sayaji Sarowar. Though the proposed tank is - - chiefly intended for this purpose, - - other incidental advantages are also - referred to, viz., that it may mitigate the effect of floods on the city from - the Viswamitri River and that the supply of water left after satisfying the needs of the city water supply would be available for irrigation.

15. Two alternative proposals are made in this connection - one to make the tank of 390 million cubic feet - - capacity (cost Rs.2,70,000) and the - - other to limit ~~km~~ it to 130 million - - cubic feet only.

The catchment area above the site of the tank is 25 square miles - -

and

and the rainfall 36.75 inches per - - annum. The catchment being flat and - the soil of the description known as - black cotton, it would be safe to - - assume a run-off of 11 per cent and to expedt an annual supply of 230 million cubic feet. The larger tank seems too big and the smaller one too small. A tank of about 250 million cubic feet is about as good a size as would do.

16. An alternative has been - - suggested of building three smaller - tanks in the valley of the same river having an aggregate capacity of 25¾ - million cubic feet only, at a total - cost of Rs.25,000.

The capacity of each of the three tanks proposed is so very small that they may silt up in a few years and may not help to mitigate the floo or supplement the storage. I would not therefore recommend the construc- tion of these smaller tanks.

17. I shall briefly touch upon the other points raised in connection with this tank, viz., its suitabilit for irrigation and mitigation of the floods.

In years of abundant - - rainfall, the excess supply may be - used for irrigation either during - certain seasons or by allowing the -

excess

excess over the water supply requirements to flow into the proposed Dhanora - - Tank. If considerations of the safety of its water supply are to be supreme, no permanent water rights should be - - created directly under this tank.

18. As regards the effect on flood discharges, the information in the file is ~~very incomplete~~ scarcely sufficient to enable me to form an opinion. The proportion of the - - catchment intercepted by the tank to the total catchment above the city of - - - Baroda, the character of the entire and part catchments, the intensity of run-off from each section of the catchment, are all factors which should be taken - into account in arriving at a decision. No opinion can be hazarded on the incomplete data now placed before me.

19. The length of the weir proposed appears to be sufficient for dealing - - with the flood. The design also seems - suitable as regards the structure proposed above bed level. But the foundations available should be inspected by a responsible officer before the design - in its entirety can be recommended as - suitable.

The

20. The questions raised in the Baroda Durbar file may now be answered as under:-

Questions.	Answers.
(1) Is the run off assumed as available for storage reasonable?	(1) The run off assumed seems excessive. It would be more safe to assume an average yield of 10 million cubic feet per square mile or a total of 250 million cubic feet.
(2) Are you satisfied with the calculations and designs for the waste weir and the provision made for the discharge and safe carrying of flood waters?	(2) The waste weir design seems satisfactory. Only, I have no idea of the character of the foundations available.
(3) The advantages claimed to be derived by constructing the tank are:-	
(i) That it will be a feeder to Ajwa Tank which supplies potable water to the City of Baroda.	(i) Will answer as a feeder to Ajwa Tank.
(ii) The water left will be used for irrigation.	(ii) Part of the remaining supply may be used for irrigation.
(iii) Prevention or at least mitigation of floods in certain parts of Baroda City, Bhimnath near the Tram Stables, Race	(iii) Will mitigate the effect of floods to some extent; but to what extent it is difficult to say without further information regarding

Road near the Railway Bridge, &c.

Do you think these advantages will be realised if the tank is constructed?

the total catchment area of the Viswamitri above Baroda, the normal and extraordinary flood levels of the river near the City, &c.

(4) Have you anything to suggest either with regard to the scheme in general or regarding any of the designs?

(4) I have only to make one or two further remarks as under:-

(i) It is necessary to make sure that the feeder channel to Ajwa Tank is of sufficient capacity and that it is properly protected by an upper bank. Particulars as to the extent of possible absorption in the channel bed and the season in which it is proposed to carry the water are not specifically stated. The design should be suitable in these respects, if much waste is to be prevented <u>en route</u>.

(ii) I would suggest that, for constructive details, Davidson's specifications for earthen dams given in 'Marryat's Specifications' of the Bombay Public Works Department may be

followed as far as possible. I had a hand in drawing up these specifications, which was done after a study of the methods followed in all parts of India and America. There are several type designs given there to suit local conditions.

In my opinion, it is important that, in the construction of earthen dams, the principles laid down in Davidson's specifications should not be departed from.

Section IV.

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21. Settling Tanks and Filter Beds, Baroda Water Supply.

The filter beds judging from their size (3 filters, 160 x 130' each) seem sufficient for purifying 2½ million gallons, but sufficient details are not available to judge why they are not effective. The two questions asked in this connection and the answers are placed in juxta-position below:-

Questions.	Answers.
(1) If water is made to pass through gravel before entering the settling tank, what do you think happens? Is the water rendered more pure and potable?	(1) The water is rendered more pure and potable for a time, but unless there is means of periodically cleaning or replacing the gravel, the rough filter is likely to get choked and prove inoperative. Organic matter is also likely to collect in the interstices and, after a time, the filter will be more a hindrance than a help in respect to the purification of water. On the whole it is not likely to prove a satisfactory arrangement.

The principle adopted seems to be based on what is known as the Peuch-Chabal system of water filtration. In that system, however, water is settled before it is passed through the gravel strainers. The operation is reversed in the Baroda arrangement, which is a decided disadvantage.

In the Peuch-Chabal arrangement, there is provision for cleaning the gravel by means of compressed air. In the Baroda arrangement, there is no such contrivance.

(2) If the settling tank is divided into compartments and the beds covered with concrete as proposed, do you think it will prevent the growth of weeds and lessen the chances of the water being polluted when in the settling tank?

(2) I think the division into compartments is desirable as it will facilitate frequent cleaning without wasting water.

There is no objection to concreting the bed. In many ways, it will be useful. But the usefulness will be enhanced if the tanks are frequently cleaned or if the depth of water is increased to 10 or 12 feet.

Bangalore,
24th March 1913.

(23

PRATAPPURA TANK.

ANSWERS TO QUERIES.

Query 1. It does not appear from the papers what run off has been assumed.

The drainage area of the proposed tank is 25 square miles. It would be reasonable to assume a run off of 11 per cent of the total rainfall (36.70 inches) seeing that the catchment is mostly black soil and the country flat. The supply available with this assumption would be about 270 m.cft. The proposed capacity of the bigger reservoir, viz.,390 m.cft. is about 50 per cent too large.

$25 \times \frac{36.70}{9} \times 2.32 : 278.25$

Query 2. As regards the design for the waste weir, the superstructure appears to satisfy the requirements. Without knowing the nature of the subsoil, no opinion can be offered as regards the foundations. The local officers may be able to judge of this better.

The length of waterway provided appears quite sufficient and may be adopted.

Length of weir 418 feet
max Head on weir - 3 feet
discharge — 8658 c.f.s
representing nearly $\frac{3}{16}$ run off -
on 25-55 miles

Query 3

Query 3. That the first two advantages mentioned can be realised there can be no doubt. But any direct irrigation from the Pratappura tank should be deprecated as it may come in conflict with the water supply whose interests should always predominate

As regards the third advantage claimed, viz.,the prevention or mitigation of floods in the city, information is necessary on the following points which cannot be traced from the file:-

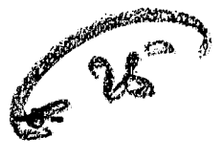
(a) the extent of total catchment of the Visva Mitri river,

(b) the nature of the whole catchment,

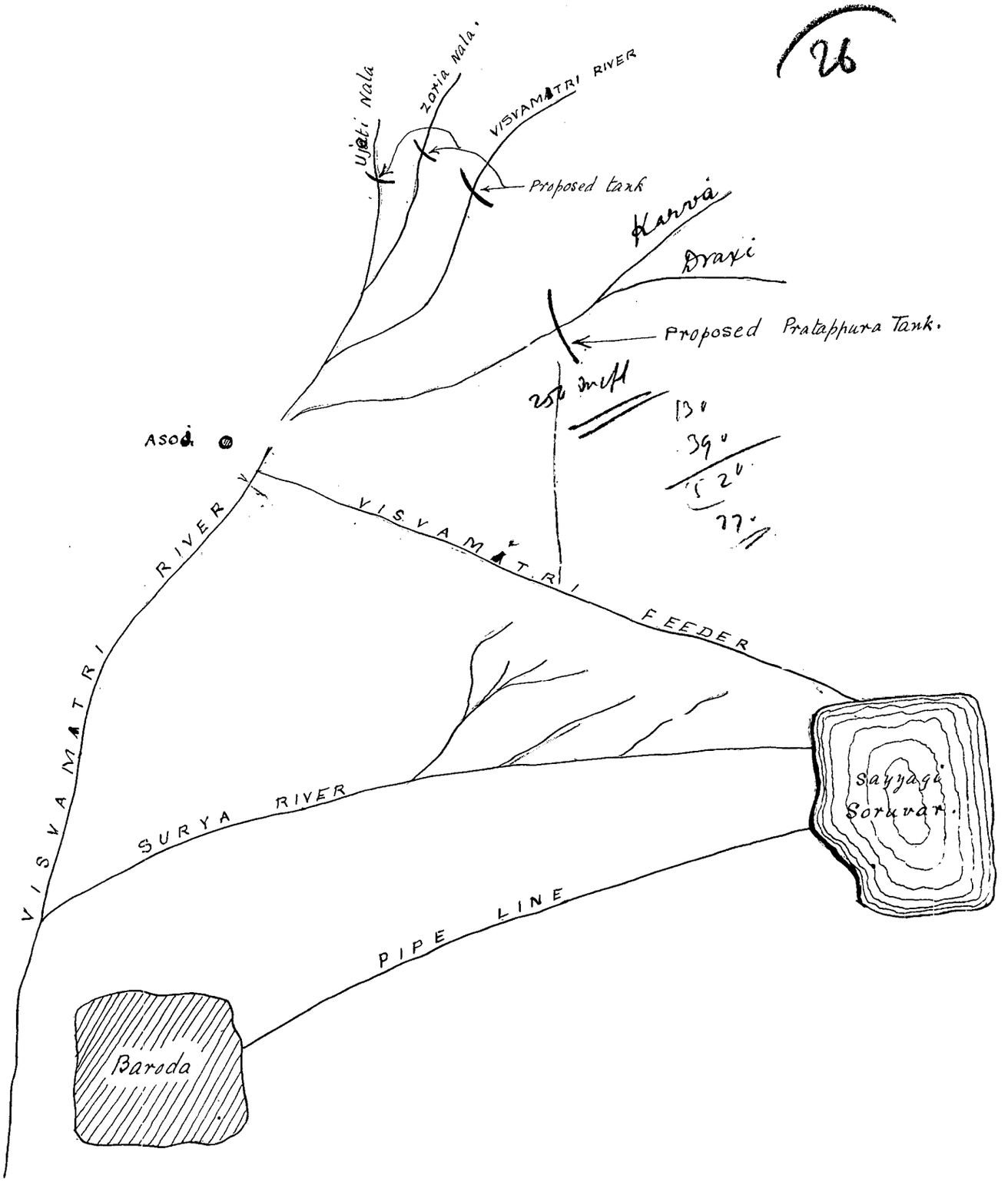
(c) the nature of the portion arrested by the tank,

(d) the heaviest rainfall in each area.

Query 4. The three small balancing tanks proposed do not appear to be of much use in mitigating the effect of floods. Their capacity is so small that they may silt up soon. Besides their cost is proportionately high. They may therefore be abandoned.



Considering that there are very few large tanks in this part of the country, it would pay to construct a large tank as the one proposed at Pratappura. But for the present, the capacity of the tank may be limited to 250 m.cft. for reasons given above.


Ujati Nala
Zoria Nala.
VISVAMITRI RIVER
Proposed tank
Karvia
Draxi
Proposed Pratappura Tank.
25% in 11
13°
39°
52'
77°
ASOJ.
VISVAMITRI RIVER
VISVAMITRI FEEDER
SURYA RIVER
Sayyaji Sarovar.
PIPE LINE
Baroda

Pol to 2003 & 26/5/13-6664

DIARY No.....

No. 3172

19/2/1913
SECTION Gen. Misc.
FILE No. 134-12
SERIAL No. 3:

FROM

P. B. WARBURTON, ESQ., I. C. S.,
FIRST ASSISTANT TO THE RESIDENT IN MYSORE.

To

The Secretary to the Government of
H.H. the Maharaja of Mysore,
General and Revenue Departments.

Dated Bangalore, 26th May *1913*

SIR,

I am directed to acknowledge the receipt of your letter No. 816 Pol., dated the 25th March 1913, forwarding the notes prepared by Mr. Visvesvaraya on the points on which his opinion was required by the Baroda State in connection with certain irrigation and water supply projects in that State.

2. The notes were transmitted to the Baroda Durbar, and I am now to convey their thanks to Mr. Visvesvaraya for his very useful notes which His Highness the Maharaja Gaekwar much appreciates.

I have the honour to be,
Sir,
Your most obedient servant,

P B Warburton

First Assistant Resident.

R. O. 2.—R. P. B.—3-1913.—1,500.